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TO THE HANDS OF THE POOR : WATER, TREES AND LAND

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TO THE HANDS OF THE POOR: WATER, TREES AND LAND

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Abstract

This paper argues for a shift in rural development strategy in India to place more water, trees and land securely in the hands of the poor. Practical precepts, including political feasibility, are used to identify and assess major potential thrusts. These include water reform on canal irrigation, equitable access to groundwater, tree holdings on forest and common land, agroforestry for resource-poor farmers, and land purchase to settle the landless.

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A Shift in Strategy

This paper explores the case for a shift in rural development strategy in India. The shift would be towards more actions to place water, trees and land securely in the hands of the poor. The ideological position puts people first, and poor people first of all, and sees development as a process which enables poor women and men to demand and secure for themselves and their children more of what they want and need. The practical position is of political realism, or practical political economy,[1] recognising that programmes which require the rich and less poor to lose are less likely to succeed that those which allow them some gains. The paper represents an attempt at what Paul Streeten (1983:886) has described as 'informed fantasy' to bridge the gulf between the two worlds of pedants concerned with detail and utopians with vision. It tries to avoid both the depressing fatalism of negative social scientists expert in showing why things will not work and the naive optimism of positive practitioners who ignore the realities of human nature and society. Some basic propositions, which may be uncontroversial individually, will be used together to identify relatively unexploited opportunities.

None of the lines of attack which follow is likely to be original. Some are already being examined or implemented. But taken together they appear to constitute a coherent strategy. To the extent that this is already being reviewed or pursued, this paper may add modest support. To the extent that it is not, the paper may serve to ask whether such a strategy deserves closer scrutiny than it can be given here.

Basic Propositions

Underlying the argument there are three basic propositions. The first two may be so generally accepted as to deserve only brief mention.

i. trickle down is not enough

Some would consider this a gross understatement, arguing that trickle down is less significant than trickle up and that many of the processes of change that accompany economic development make

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1. For an elaboration of this approach see Chambers 1983b:160-4.

the poor poorer. Even those who believe that the green revolution, the spread of irrigation, and the new prosperity of some rural areas have made the poor less poor than they would have been (a view I generally share) agree that a 'free-for-all' approach can never at all adequately tackle rural poverty; and that special, conscious, directed interventions which do not follow the natural channels of allocation of power, selfishness and the market, are imperative if the poorer are to gain the livelihoods they want and need.

ii. current efforts against rural poverty are not enough

The most visible response to the challenge of rural poverty has been government-administered programmes. In academic circles and within government itself, there is criticism, and evidence of both realism and some disillusion. The succession of special administered programmes - SFDA, MFAL, TRYSEM, NREP, IRDP - intended for 'target groups' of 'beneficiaries' - have, as is well known and recognised, not been easy to implement well: they are administration-intensive; disbursements are slow; "beneficiaries" are sometimes little benefitted or even left worse off than before; and benefits are quite often captured by those who at the local level are less poor. It is easy to be too negative about these and other programmes and to ignore successes and notable progress: the Employment Guarantee Scheme in Maharashtra, for all its shortcomings; the fair price shops where these have been pushed out into rural areas; the massive spread of rural electrification; the tripling of irrigated area since 1947; the rise in life expectancy from 33 in 1947 to 52 in 1980. Such major achievements are easily overlooked or undervalued. There are countries, like Zambia, Tanzania, Laos and Kampuchea where conditions for the majority of rural people are worse than they were 20 years ago. The same cannot be said of much of India. Nor does the argument which follows necessarily imply that other programmes should be halted or abandoned. Often programmes are given up, or superseded, too soon - abandoned at the time of maximum criticism and maximum difficulty, just when those criticisms are being met by reforms and improvements and when the difficulties are being reduced or overcome. Nevertheless the scale and depth of rural poverty remain such that more seems needed than what is already being done or proposed. Nor is it merely a question of generating livelihoods to tackle current poverty. The rural population rose from 439 to 525 million from 1971 to 1981, and may reach something like 730

million by 2000.[1] Livelihoods will be needed to mitigate the future poverty of this much larger number of people who will be seeking to survive in rural areas.

iii. poor rural people want and need secure, adequate and independent livelihoods, and health

Of course, they want much more than these. But for those who are most deprived - let us say the poorer half of the rural population (roughly those who are below the poverty line) - livelihoods and health are preconditions for obtaining and enjoying the other things they want and need. Livelihood here is used to mean an adequate, secure and independent stock and flow of cash and food for the family and its individual members throughout the year, and buffers against contingencies. That those stocks and flows should be adequate means that they should provide for subsistence and basic needs. That they should be secure is vital: vulnerability leads to the indebtedness, dependence and exploitation which traps so many. That they should be independent is a wish which often cannot be fulfilled, for it is in the nature of livelihoods that they involve inter-dependencies. But the implication here is that livelihoods in which families own and control the means of production, and thus have a degree of autonomy and power in their relations with those who represent the market, are preferred. As for health, it is a universal basic desire and need, most of all with those, the poor, who have it least.

Employment Thinking and Livelihood Thinking

Livelihood can be contrasted with employment, and livelihood thinking with employment thinking. Employment, in its common and commonsense meanings, is a concept of 'core' places and 'core' people. It has urban and industrial connotations, and implies employers, employees, jobs and cash remuneration. Transferred to rural and subsistence conditions, it often does not fit well. Livelihood appears a concept which fits better in 'peripheral' places and with 'peripheral' people. It can be seen to have rural,agricultural connotations, and implies access to and control over resources for both cash and subsistence. Applying the Greek proverb 'The fox knows many things,

1. The 730 million figure is based on a national population of one billion by the year 2000, divided as urban 270 million and rural 730 million. The main point being made - that there will be many more people in rural India - is likely to stand even if substantial changes are made in these estimates.

but the hedgehog knows one big thing' to the poor,[1] it can be seen that employees in formal urban and industrial situations tend to be 'hedgehogs', with one job, one employer, and one source of income, while many (though not all) of the poorer rural people are 'foxes', seeking their livelihood by exploiting a repertoire of varied activities at different seasons. To help a hedgehog usually requires organisation and political action. To help a fox can also entail strengthening the repertoire and adding to it.

A further contrast between employment thinking and livelihood thinking concerns buffers or cushions against contingencies. Security for a formal sector urban employee may be sought through improved terms of service, medical insurance and sickness benefits, pension funds, and the like. Security of livelihood for a poor rural household comes more from command over buffers - assets which can be realised to meet contingencies such as sickness, accidents, food shortages, bribes, legal fees, ceremonies, bridewealth, dowry, funerals, theft, damage by fire and flood, and so on. The need for such buffers, worldwide, has increased with the weakening of the social supports of mutual 'primitive' sharing which earlier provided more security. But urban-based bearers of modernity have not recognised this new need but have rather projected into the rural periphery their own concepts of employment and income-generation. The policy implications are enormous. For if buffers (or realisable wealth) are more needed by the rural poor than they used to be, then assessments of poverty and well-being which rely only on income streams become more misleading. A household with lower income streams but more assets can be better off (because less vulnerable) that a household with higher income streams but fewer assets (because more vulnerable). The practical implication is that programmes of poverty alleviation should enable poor people to gain secure command over realisable assets as well as over flows of food and cash.

Employment thinking and livelihood thinking lead to different prescriptions and programmes. Trees and forest land provide an example. An employment strategy could involve the recruitment of wage labour by a Forest Department or a Forest Development Corporation. A livelihood strategy could involve the allocation to

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1. For elaboration of this application, see Chambers 1983b:142-3.

poor people, of plots on which to grow trees to provide themselves with appreciating assets as one component in their livelihoods. (Trees are good buffers: they are divisible, unlike milch cows; wood can be sold at most or all times of the year; and the market is often large enough that conspicuous distress sales are not involved in meeting a contingency). In practice, Forest Departments, commercial interests in forestry, and donor agencies are programmed into employment thinking, instead of livelihood thinking, about trees. As a result it is easy to overlook the opportunity for enabling the poor to get more of what they want and need, and at the same time restore and maintain the trees that Foresters want. Most significantly, the employment strategy appropriates to the state, commercial interests, and sometimes corrupt officials and politicians, most of the value added by tree growth. The livelihood strategy would transfer much of that to the poor.

Generating Livelihoods

Livelihoods can be generated in many ways. Five of the main approaches are:

i. creating demand for labour. This may be part of whatever trickles down. If labour is scarce, and capital is not - substituted for labour, then as demand for labour rises in relation to supply, the bargaining position of labour should improve and wages should rise.

ii. income capture. Through organisation and pressures, wages can be forced up, and the poorer people can capture more of the value added.

iii. off-season employment. Providing off-season gainful employment to fill in slack periods as with the Maharashtra Employment Guarantee Scheme, the Food for Work Programme, and now the Rural Landless Employment Guarantee Programme.

iv. raising productivity. Making more productive the existing resources of those who lack adequate livelihoods. This applies especially to marginal and small farmers who already have assets in land.

v. command over assets. The provision of new productive assets is the IRDP approach. This can be extended to include command over natural resources such as land, water and trees. This applies especially to those who are landless, who are displaced by development, or who are marginal and small farmers unable otherwise to gain an adequate livelihood.

All are important, but this paper will focus mainly, though not exclusively, on the last approach as applied to natural resources.

Seven Practical Precepts

A strategy for identifying opportunities to generate livelihoods can be defined by seven practical precepts or guidelines. Individually, they are unremarkable, but taken together they push analysis towards a fairly coherent set of proposals. The seven precepts or guidelines are:

i. resources: find underexploited, unappropriated, misused, or otherwise obtainable resources. The first stage is a search for resources, old or new, or resource combinations, which the poor can be enabled to control and exploit.

ii. gaps: find opportunities presented by gaps between disciplines, professions and departments. The technology and opportunities opened up by the main lines of disciplinary, professional and departmental work have generally fitted the needs and resources of the less poor, and have been appropriated by them. The underdeveloped gaps between disciplinary, professional and departmental main line concerns can present unexploited opportunities which have not yet been appropriated (Chambers 1983b: 180-5).

iii. fit: design innovation and actions to fit the needs, desires and resources of the poor. Most R and D, most innovations, and most programmes, have a 'genetic' character built into them which favours the less poor who then gain most or all of the benefits. For this reason, much of the potential of R and D for the poorer people, for their resource endowments, is underdeveloped. And being underdeveloped, it presents an opportunity.

iv. local focus: concentrate effort geographically. Needs and opportunities are often environment-specific. More intensive management and monitoring can be achieved in limited areas. Many of the more successful rural development programmes have had a restricted and manageable geographical focus, and many of the less successful have been country-wide.

v. early control: enable the poor to gain ownership and control early on. With much development, there is a critical period when rights are established. Usually this period has passed by the time questions are asked about who has those rights, and who will benefit and how, and who will lose and why. Especially where natural resources become more productive, it is vital for the poorer people to get their hands onto those resources, and establish their rights to the benefits right from the start, or even before the start.

vi. rights: establish the legal and administrative rights of the poor, informing them, and enabling them to secure their rights. There are temptations to keep the poor weak. Government officials and even workers in non-government organisations are sometimes inclined to maintain the poor in dependent relations, not owning the means of production or other resources, not having enforceable rights of access, not having rights to goods and services, and not knowing what their rights are. Deliberate efforts to establish rights, to inform the poor about them, and to provide machinery for their enforcement, are indicated.

vii. no direct losers: choose actions which do not require that the rich and the less poor become worse off. Rural development, in which the rich and powerful lose directly is only feasible with a more powerful political base for the poor than exists in much of India, with some partial exceptions such as Kerala and West Bengal; and even in Kerala and West Bengal, development in which all gain is likely to stand a better chance of success. It is true that if the poorer are enabled to appropriate and develop a new resource, the less poor may have a sense of loss because they are not the beneficiaries; but at least the less poor should not be losing in absolute terms. Moreover, strategies can sometimes be found which are the Chinese 'all boats float higher' as the tide comes in: in which all gain. This is straightforward practical political economy in seeking what is feasible, that is, what the powerful and less poor may support or tolerate.

Seven Thrusts

The working thesis of this paper is that measures which meet most or all of these seven precepts, should have a fair prospect for establishing families with secure, adequate, and independent livelihoods. The starting point is to search for under-exploited, unappropriated, misused, or otherwise obtainable rural resources and resource combinations. Four stand out:

A. Canal irrigation water (on major and medium irrigation)
B. Groundwater
C. The uncultivated half: forest land, common land and trees
D. The cultivated half: private agricultural land

Applying the precepts to those resources leads to the identification of seven potential thrusts. These will be summarised in brief. How the precepts fit and support the proposals cannot be adequately presented in a paper of this length, but is outlined in the appendix table.

A. Canal Irrigation Water

The potential created under major and medium canal irrigation (i.e. with cultivable command areas of 2,000 hectares and above) is now (1984) approaching 30 million hectares (GOI 1984:9). Of that area perhaps only about a half[1] receives significant irrigation (i.e. irrigation which raises gross crop values by a half or more, together with risks reduced to a level which induces substantial changes in farming practices). Almost everywhere outside the strict warabandi systems of Northwest India (Malhotra 1982) and outside some delta areas, the productivity of irrigation water and the equity of its distribution are typically low. As a result, the livelihood-intensity of its use is low.

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1. This estimate may seem harsh to some and overgenerous to others. Some of the relevant evidence and argument can be found in Ali 1982 Vol. I pages 19-50; Chambers 1983a; GOM 1981; Lenton 1982; Padhi and Suryavanshi 1982; Pant 1981; Seckler 1981; Swaminathan 1982:96; and WAPCOS 1980.

1. Water Reform

On most canal irrigation systems, the distribut ion of water on the main system is permissive and offers enormous scope for improvement. Very often water is allowed to flow continuously without rotations. Headreaches often receive too much water and tailends too little, if any at all. The delivery of water is often unreliable, untimely, and not known about by cultivators in advance. That there is much scope for improvement has been demonstrated in the reformed management of some systems (see e.g. Joshi 1983; Lele 1983).

Canal irrigation main system management has been a blind spot (Wade and Chambers (1980)), a professional gap[1]. Canal irrigation systems allow a geographical concentration of effort. Most significantly, there appears to be scope for redistributing water in ways which are politically feasible in that all irrigators can gain. Headenders who receive less water (because of rotations and redistribution of water to the tails), may gain through a more reliable supply known about in advance, less waterlogging and flooding, less washing out of fertiliser and nutrients, sometimes increased cropping intensity (if some of the water saved can be used by them later), and the opportunity to grow a wider range of crops (see e.g. Joshi 1983 for water reform on the Morna Project in Eastern Maharashtra).

Where canal irrigation is already in operation, the time of greatest opportunity to establish clear rights to water has passed. However, a sense of right is being established by widespread attempts to introduce warabandi outside the Northwest, the target for 1983-4 being 750,000 hectares. While in the writer's view, the preconditions for a strict timed warabandi do not exist on most canals, the process of trying to introduce it, including calculations of the rights of each farmer, the erection of a board at the outlet showing entitlements,

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1. The abstracts of 216 postgraduate theses presented in 1970-1975 in hydrology and related subjects at 22 Institutes of Technology, Engineering Colleges, or similar institutions in India include only one, doubtful, mention of methods of distributing water on canal systems (1NC for 1 HP 1977). In the leading textbook on Irrigation Engineering (Singh 1979: 168-169) methods of distributing canal water are mentioned but are not treated as a major subject of professional concern, receiving less than two pages out of 563 in the text.

and the installation at the outlet of a measuring device which farmers can monitor, can raise awareness and strengthen demands for water on the part of groups of farmers; and this in turn is likely to encourage improved main system water distribution.

On new canal irrigation there is a further opportunity, to introduce a sliding scale of water rights to favour smaller farmers. "Equity" in water distribution is usually defined as water in direct proportion to holding size. On new canal systems, where larger farmers have not yet established customary rights to water, a different principle could be introduced (as is already reported from some places in Maharashtra) where small farmers receive more water per unit of land than larger farmers.

A final option is an irrigation guarantee scheme, in which, subject to supplies at the diversion or in the reservoir, irrigation would be guaranteed to groups of cultivators, with financial compensation payable in default.

Water reform on these various lines has very large potential for generating livelihoods. It would not provide buffers directly, but it would raise the incomes of millions of marginal and small farmers, landless labourers, and others indirectly benefitted by increased agricultural production. More reliable irrigation creates the preconditions for adoption of high-yielding practices. Increased intensity of irrigation creates work and income at otherwise slack times of the year. Higher demand for labour raises wages. At a rough estimate, water reform might reduce or eliminate waterlogging and flooding on 3-4 million hectares, and benefit some 6-8 million hectares of tailenders. The incomes of millions of poor rural people would be raised and made more stable.

B. Groundwater

Estimates of the usable renewable recharge of groundwater have been rising, and have more than doubled in the past 14 years (Sinha 1983). An estimate of groundwater recharge by Raghva Rao in 1969 was 17.7 million hectare metres (ibid table 1), compared with a Central Groundwater Board estimate in April 1983 of a potential of 42.3 million hectare metres (Saksena 1983: 101).

The increased estimates can be attributed to the following factors:

a. increases in the groundwater. As new canal irrigation is installed, so seepage and recharge of groundwater increases. Similarly, as lift irrigation increases, return flows through seepage back to groundwater increase.

b. discovery of new groundwater. State level groundwater surveys have been discovering more water.

c. increased recharge. In areas like much of the lower Gangetic basin, where there is 100 per cent recharge each year, or at worst every few years, the more groundwater that is extracted, the greater is the recharge from the monsoon and its floods.

d. changes in estimation procedures. The extreme technical difficulties of groundwater estimation are associated with very approximate rules of thumb which are being refined and sharpened.

As groundwater has been increasing, and estimates of its potential have also been increasing, cumulative time series data have given a contrasting impression of remaining potential. R.S. Saksena (1983) has pointed out the discrepancy between estimates based on gross hectares irrigable and those based on groundwater potential. Gross hectares irrigable from groundwater were estimated in the Report of the National Agricultural Commission (1976) to be 40 million hectares. Of these, cumulative figures for potential created and utilised reached 25.6 m. ha. or 64 per cent by April 1983. In contrast, the groundwater estimates of the CGWB give a utilisation of 10.0 m. ha. m. against the potential of 42.3 m. ha. m., or a utilisation of only 24 per cent of the potential. As these figures are reconciled, the estimate of gross hectares irrigable can be expected to rise.

Whatever the final figures, there seems no room for doubt that the groundwater potential of India is much greater than earlier believed, and that it presents immense opportunities for millions of the rural poor. The spread of rural electrification and the increase in lift irrigation (see e.g. Dhawan 1982:27; Charlu and Dutt 1982: 92-3) have been little short of spectacular during the past three decades. In one perspective, this can be seen as a

countryside scramble for a last frontier. The big question (IDS 1980) is who will appropriate and gain from the untapped remainder of this vast resource. Applying the seven precepts and guidelines, there appear to be three main approaches to enable those who are poorer to gain more.

2. Small-scale technology

There is a power gap between lift by human and animal power at the low end, and 5 HP diesel and electric pumpsets at the high end. (3 HP pumpsets are on the market and are purchased, but their prices are close enough to 5 HP pumpsets to make the latter often preferable even if they involve installing overcapacity). For Uttar Pradesh, S.P. Sangal (1983: 421) estimates that a private 5 HP pumpset irrigates on average a gross total of 5 hectares in kharif and rabi. However, in UP over 80 per cent of operational holdings are less than 2 hectares, and comprise over 40 per cent of the agricultural area. For millions of these small and marginal farmers there is no scale of technology on the market which fits their land size. In Kerala there are lowlift pumps at less than 3 HP, but elsewhere in India there is a conspicuous gap. If a technology could be found or devised which was cheap, robust, efficient, and appropriate for the scale of operation of small and marginal farmers, it might enable millions of them to gain independent access to groundwater under their own control.

For the time being, biogas, wind, and solar energy appear unlikely to lead to breakthroughs. There may also be technical difficulties concerning size of tube, friction, use or storage of small flows of water, and diseconomies of small scale. All the same, the need and opportunity are so enormous, involving as they do millions of precisely those farmers whom Government policy is seeking to reach and help, that there would seem a good case for intensive R and D and field trials.

Two of the more hopeful possibilities are:

i. battery-powered small electric pumpsets. Batteries would be charged mainly at night (which is when much electricity reaches rural areas anyway), in villages (thus eliminating the normal overhead costs of connections to pumpsets in fields), and then carried to the fields for use during the day.

ii. producer gas generating electricity for decentralised supply to small pumpsets (Joshi et al 1983). Surprisingly, calculations suggest that wood-based producer gas, using 20 per cent diesel, could operate a 10 metre lift with the energy generated by growing trees on only 3.2 per cent of the land so irrigated. A scenario can be envisaged of the lower Gangetic basin being fully irrigated during rabi mainly using decentralised independent energy grown in the villages themselves.

If such technologies could be developed, they might provide excellent assets for IRDP loans in the Seventh Plan, and might enable millions of marginal and small farmers whose land lies above good aquifers close to the surface to rise above the poverty line.

3. 'Saturation' and Sale

Where there is an extensive and accessible aquifer, as in much of the lower Gangetic basin, the normal pattern of exploitation of groundwater can be described as 'spotty'. Larger farmers with access to credit instal tubes and pumpsets and irrigate their land. Irrigated land then appears as spots, with unirrigated gaps in between, consisting mainly of the land of smaller and marginal farmers. It is the old story of the'haves' getting more, and the 'have-nots' being left out.

There are, however, areas with good aquifers where villages can be described as 'saturated' with groundwater lifting capacity. This is especially common in Western Uttar Pradesh. An entire village is irrigated because those without tubes or pumps or engines buy from those who have them. One estimate for UP as a whole, is that of a gross total of 5 hectares irrigated by a 5 HP pump, no less than 2 hectares are irrigated through sale of water to neighbours (Sangal 1983: 421). In one village (Saidaya) in Gonda District, saturation of this sort, combined with fragmentation of holdings, appears to sustain a stable market for hiring neighbours' tubes and for hiring diesel pumpsets. A farmer who buys water for one plot may be selling water from another. Quick casual interviews have indicated the following range of situation among six farmers

(A to F):

	A	B	C	D	E	F
Parcels owned	4	7	3	Over 2	1	4
Tubewells owned	-	-	1	2	1	1
Others' tubewells used	4	4	2	-	-	3
Pumpset owned	-	-	1	1	1	1
Parcels irrigated	4	4	3	2	1	4

(Farmers B and D had small parcels which were unsuitable for irrigation)

(Chambers and Joshi 1983)

This suggests saturation and sale as a fairly equitable approach to groundwater development where there are good and extensive aquifer. The approach could be through credit melas, as recommended in the Sixth Five Year Plan (GOI 1981: 153). These would involve intensive activity over a short period in villages where saturation was feasible and generally desired, and would include credit, the installation of tubes, and the supply of pumps and engines. Rather like a zipper, these camps would proceed, leaving behind villages in which all the land was linked to groundwater. Every farmer would then either have direct access to groundwater or opportunities to buy water from neighbours.

4. Organisation for Equity

Organisation for equity of access and distribution of groundwater may be required either by the scale of lift technology or by the scarcity of water.

In the absence of suitable very small-scale lift technology, larger pumpsets have to be used. If these are to be controlled and used by small and marginal farmers, they have to combine and organise. An example is presented by groups in Vaishali, Muzaffarpur and Deoria Districts, where medium and large pumpsets have been installed with farmers who have organised sharing among themselves (Pant 1984)[1]. In Deoria District, in particular, there has been success in involving small and marginal farmers and the weaker sections. Compared with Vaishali and Muzaffarpur, groups are smaller (an average of 8 compared with 16), and pumpsets smaller and command areas are also smaller (11 acres compared with 16).

1. These groups have been organised by Vaishali Area Small Farmers Association (VASFA) in Vaishali and Muzaffarpur Districts in Bihar and by the Indo-Norwegian Agricultural Development Project (INADP) in Deoria District in U.P.

Scarcity of water can also provide the need and incentive for organisation and sharing. In Purandhar Tehsil of Pune District, in the rainshadow of the Western Ghats where water is scarcer than land, the Gram Gourav Pratisthan and the system of pani panchayats pioneered by Vilas and Kalpana Salunke have achieved equity in access and in distribution of scarce water (Morehouse 1981; GGP 1983). Under the GGP, irrigation water is lifted from percolation tanks, dam reservoirs or wells in nallahs. Among participants, water is allocated to areas of land proportional to the numbers of members of the family, rather than according to landholding size. This arrangement is agreed right from the start of a new group. The approach may prove to be applicable elsewhere where water is scarcer than land, and where cultivable land and landholdings have suitable configurations.

Wherever there are technical reasons for larger rather than smaller scale in lift technology, and wherever water is scarcer than land, sharing arrangements may often be the best solution for farmers who are smaller and weaker. The relative successes in Deoria District and with the Pani Panchayats would merit further study and extension. However, not enough appears to be known yet in detail about the dynamics and operation of lift irrigation groups for safe generalisations to be made about the scale to which they might spread.

C. The Uncultivated Half: Forest Land, Common Land and Trees

The potential for livelihoods here is presented by the 'uncultivated half' of India (Romm 1979) and the trees and other vegetation they grow, or more importantly, could grow. Of the 266 million hectares of land in India which require biological management, 143 are reported as cultivated and 123 as uncultivated. Increasing attention has been drawn to the degradation of many of these lands, especially in the uncultivated half (see e.g. Vohra 1980; CSE 1982). Of the total area, wastelands, defined as lands currently producing 20 per cent or less of their dry weight biological potential, are commonly estimated at about 100 million hectares. Most of these wastelands are in the uncultivated half. Within this half, land classified as forest is 75 million hectares. Of this forest land, less than half was reported in 1981 to be under adequate tree cover (GOI 1981: 344), and a recent order of magnitude estimate suggests that the area actually under forest cover could be as low as 23 million hectares (personal communication William Bentley).

Tree cover in the forests has been reduced by felling by contractors and the Forest Department, and has also been reduced by the pressures of population and poverty. On much land classified as forest, production falls very far short of the biological potential.

The existence of wastelands and the removal of forests are usually presented as problems. Their existence can also be seen the other way round, as opportunities for livelihoods on a grand scale.

This would appear to apply more to Forest lands than to common (Panchayat, revenue etc.) lands. Common lands have been shrinking rapidly through encroachments and allocations. N.S. Jodha (1983: 12) has found over three decades a decline in the area of village commons in Rajasthan (6 villages) to less than a half and in Madhya Pradesh (18 villages) to less than a quarter." Moreover, it would be surprising if it were not usually the better common land that was appropriated or allocated so that what remains will be the poorer land with lower potential even under good management. In contrast, there has been no comparable scale of appropriation of Forest land. To the contrary, it would appear that the area of Forest land producing far below its potential has been increasing, thereby augmenting the unrealised potential. Moreover, it may be that forest cover has tended to be removed from the more fertile and more accessible areas, which are now available for replanting and colonisation.

The most livelihood-intensive and socially and ecologically stable production systems on Forest and common land wll vary with conditions: in some areas they may be exclusively tree-based, but in others they will entail various combinations of trees, livestock and crops. If trees are the main component of the potential, the major question is who gets the value added by tree growth. This question is sharpened as tree products (timber, firewood etc.) rise in value relative to food and other basic goods.

5. Tree Holdings on Forest and Common Land

Present patterns of appropriation, allocation and exploitation of land and trees mainly benefit larger farmers, commercial interests, and the State. In his Rajasthan villages, Jodha found that the privatised common lands acquired by those who already had large holdings were five times greater than those acquired by the landless (ibid 10). With Forest lands, parastatal and commercial organisations

including Forest Development Corporations have tended to be the main beneficiaries. In Karnataka, to take one example, 75,000 hectares of Forest land have been leased to Mysore Paper Mills, whereas leasing Forest land to individuals is expressly prohibited by law (personal communication G. V. K. Rao).

That livelihoods for the landless and marginal farmers can be generated through smallholder tree and/or agroforestry farming on Forest land, and to a lesser extent on non-Forest wastelands,has already been demonstrated. The establishment of livelihoods on Forest land has been achieved through the regularisation of encroachment in a number of places. There has also been organised small-holder settlement on Forest land, as in Gujarat under the auspices of the Satguru Seva Sangh Trust (PEO 1980: 51). In this case, tribal families have been settled on one hectare each, growing trees, grass, crops and livestock.

In any future programme for smallholdings on Forest and common lands, two key issues would be size of holding, and credit. The average holding size needed for a family livelihood might be larger than the one hectare of the Satguru Seva Sangh example. This would depend on various factors including land quality and rainfall, whether crops and livestock were included as well as trees, whether the holding and its trees were to provide an entire livelihood or whether these were to be supplemental, whether the trees were mainly buffers for the vulnerable or sources of steady income, and so on. Credit and other support would be required during the period of tree growth before yielding; but credit might not be a serious problem given the need of banks to disburse more of their targets for rural poverty-oriented lending and by the increase in scale proposed for the IRDP.

With the necessary policy decisions and administration, it would seem that millions of family livelihoods might be generated from existing Forest land. Even if the allocation had been as large as 5 hectares per family, the 75,000 hectares leased to Mysore Paper Mills might have directly supported some 75,000 landless people. If 10 million hectares of treeless forest land were so allocated, the direct beneficiaries would be 10 million people; and if, as might well be the case, the average were less than 5 hectares a family, the total could be much greater. To say that the benefits from a successful large-scale programme for smallholder settlement with trees would be substantial may be putting it too modestly: millions of hectares at present without

trees would be reforested; much of the value added would be captured directly by very poor people; and a massive impact would be made on rural poverty.

D. The Cultivated Half: Private Agricultural Land

The 143 million hectares of private agricultural land represent the most obvious highly productive rural resource. The history of attempts at land redistribution through land reform legislation and its implementation shows some limited successes, especially with tenancy legislation, but has been generally disappearing. Similarly, attempts to enable resource-poor farmers to become more productive and reduce their risks have encountered many difficulties. Several novel approaches may deserve to be considered. These include changes in the model used for agricultural research (Chambers and Ghildyal 1984) so that the technology generated fits resource-poor farmers' conditions; and the acquisition and redistribution of the land under command wherever new canal irrigation is introduced (as occurs in Sri Lanka and parts of Africa). Both these would seem to deserve further elaboration. In this paper, however, two other promising possibilities will be examined: the first on the land of resource-poor farmers; and the second with the land of resource-rich farmers.

6. Agro-forestry for Resource-Poor Farmers

Agro-forestry is defined here, following Lundgren and Raintree 1983 and Labelle 1983 as

> 'a collective term for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management unit as agricultural crops and/or animals, either under the same form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components'.

Resource-poor farms are defined to include those which cannot under current practices provide adequate livelihoods for farm families from farming alone. As such they include most marginal farmers (0-1 ha) on good land, with or without irrigation, and marginal, small and some larger farmers on poor land.

There are already numerous indigenous agroforestry systems, including palms and tapioca in Kerala, fruit trees and wheat in Himachal Pradesh, and the fodder tree Khejri (Prosopis Cineraria) and field crops in Rajasthan. Relatively little research has been undertaken on agroforestry combinations and new priority has been given by ICAR through its All-India Coordinated Research Project in Agroforestry (Singh and Randhawa 1983). Disciplinary specialisation has inhibited the research collaboration of agronomists concerned with crops, foresters concerned with trees, and animal specialists concerned with livestock. Resource-poor farmers have also probably been disinclined to experiment in agroforestry because they are risk-averse and have short time horizons whereas trees take rather long to grow and yield. For their part, agroforestry may not be so attractive to resource-rich farmers, who are the usual innovators in agriculture, since it tends to be more demanding in management and labour-intensity (Raintree 1983; Bentley et al 1984). It thus appears a 'gap' subject with potential benefits for the resource-poor.

These potential benefits are:

i. higher total production and income. In well designed AF systems, total biomass production should increase, with photosynthesis taking place round more of the year and more rainfall retained in the soil. The biomass may be converted into or take the form of food and/or useful or saleable goods which raise the total income of the farm household.

ii. reduced risk. As with intercropping of pigeonpeas with other crops (Willey et al 1983), risks of crop and income failure should be diminished through factors related to micro-climate (more stable temperature, higher humidity), soil fertility (mulching, Nitrogen-fixing trees, trees which lower high pH or raise low pH), season (photosynthesis by trees during the dry season, and fodder for animals when they need it most), and diversified product (tree and animal as well as crop products).

iii. buffers against contingencies in the form of trees and wood.

iv. productive labour in seasonal slack periods. Tree-related activities are less time-bound than crop-related activities, and may be fitted better into seasonal slack times.

v. substitution on-farm for declining common property resource (CPR) products. CPR products are diminishing, and are a more significant proportion of income for the poorer than for the less poor (Jodha 1983). Agroforestry systems (including, for example, grazing, browse, bamboos, reeds, fruit trees, or multiple purpose trees of various types) may provide a means for resource-poor farm families gradually to transfer from dependence on CPRs which are subject to the tragedy of the commons to growing CPR products on their own land.

vi. relative independence of purchased inputs. AF systems may substitute tree leaf mulch, dung, root-zone N-fixation, biological control of pests, and improved soil conditions, for purchased inputs such as fertiliser, and pesticides. Where there is a high groundwater table, as in much of North Bihar, trees may serve as poor people's pumps, costlessly raising water and using it in photosynthesis without dependence on purchased diesel or electricity supplies.

In all these respects, except for the first (higher total production and income) AF systems may better fit the needs and capacities of resource-poor than of resource-rich farmers. Near the Dharwar campus of the University of Agricultural Sciences, Bangalore, where much pioneering AF research has been conducted (Patil 1983), there is an impression that smaller farmers are adopting AF practices more than larger (personal communication S.V. Patil). Research and development for new AF systems is not easy, but the eventual benefits could be very high, especially since a number of future AF systems may, unlike the classical green revolution technology, be adopted more by resource-poor farm families than by those who are resource-rich.

7. Land Purchase to Settle the Landless

The focus on land reform, entailing state action and a perceived loss on the part of those who are locally powerful, has tended to obscure the simpler approach of buying land on a willing seller basis and then parcelling it out to the landless.

The feasibility of a land purchase and settlement programme is supported by the existence of a land market and of sales by larger landowners. Their willingness to sell at reasonable prices will obviously vary considerably. Willingness to sell and low prices

can be expected where there is a security threat or where there is concern about the possible implementation of land reform. Larger landowners are also sometimes willing to sell to raise capital for investment in lift irrigation or for children's education as reported for villages in Maharashtra and Andhra Pradesh (Cain 1981), or when migrating permanently to town as with some village Brahmins in Tamil Nadu. Experience has already been gained with the purchase of land and its settlement by landless families by LAFTI (Land for the Tillers Freedom) in Thanjavur District and other successful settlement has been managed by another non-government organisation, MYRADA, based in Bangalore.

Potential benefits of a successful land purchase and settlement programme should be high. The inverse relationship (that productivity per unit of land varies inversely with holding size) suggests high production from the land settled. More important, with secure tenure, landless families would be getting what they want and need for independent livelihoods. The land should also be better than much of the common land previously allocated for settlement. Where the IRDP provides livestock to landless families, the addition of even a small plot of land might sharply improve viability by enabling the family to feed its animals.

Economic and financial feasibility would require careful assessment, and there would be a case, as with other target group programmes, for subsidy. One possibility would be simply to extend the IRDP to include land purchase and settlement. This might help overcome the problem of how to find viable enterprises for the trebled or quadruplied sums projected for the IRDP in the Seventh Five Year Plan.

Conclusion

These thrusts or proposals would be designed to give large numbers of poor people direct access to and control over natural resources of water, trees and land. With the resulting power and independence, they might then be better able to fend for themselves. But these proposals could not solve all rural poverty. Quite deliberately, none of them takes on the problems of power and exploitation frontally. Instead, they seek ways round the side, to enable the poor to capture benefits without the less poor losing directly. They are also speculative, and whether the fantasies are well enough informed the reader will judge. All pose problems and

uncertainties. Some - small-scale pumps and agroforestry for resource-poor farmers - depend on the identification and development of new technology. Others - the redistribution of canal water and the settlement of landless families on Forest land - face professional and departmental constraints. Yet others - saturation with ground-water irrigation capacity, organisation for equity, and the purchase of private land for settlement - would require new procedures and perhaps institutions. All, to varying degrees, might be vulnerable to inefficiencies and corruption. But it is always easy to find reasons why proposals will not work, to find problems for solutions. It is also safer and more in the traditions of social science and scholarship to be guarded and detached. This paper has been written in a different, risk-taking spirit, trying to use the experience of critical social science to identify opportunities. If the proposed thrusts are not misguided, successful pursuit of them might transform much of rural India by the end of the century. More modestly and realistically, one may ask what might be achieved by selective support of present and future efforts in these directions; and whether when more carefully assessed and unexplored, these approaches do indeed offer scope for enabling millions or even crores of the poorer people to secure the livelihoods they want and need.

Acknowledgements etc.

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ecepts sts	i. Resources Find under-exploited, un-appropriated, misused or obtainable resources	ii. Gaps Find gaps between disciplines, professions and departments	iii. Fit Design to fit the needs, desires and resources of the poor	iv. Local focus Concentrate action geographically	v. Early control Enable the poor to gain early ownership and control	vi. Rights Provide legal rights, information and aid	vii. No direct losers Do not require the rich and less poor to lose directly
ater to the il	Canal irrigation water over-supplied in the head reaches	Canal water distribution not part of engineers' training	Tailenders' need more water, Tailenders, SFs and MFs get more when it is less scarce.	Whole or part of particular canal systems.	Only possible with new irrigation. With old systems, redistribution needed.	Provide legal rights, information and aid.	Diagnostic methodology to identify ways. Headenders also gain or do not lose. Better off tailenders also gain
mall-scale echnology or lift rrigation	Groundwater under the land of S and MFs.	Pump and engine manufacturers supply market of larger farmers with more effective demand. Lack of R and D.	New technology designed to fit needs of S and MF's.	Areas with groundwater near surface, good recharge, and many S and MFs.	Supply direct to S and MF's who own engines and pumps and use them as their own land.	Information about programme and rights under it. Assistance in obtaining credit, engine, pump, etc.	No direct loss, and no gain. May lose labour supply indirectly.
"Saturation" and sale	Groundwater in areas with good recharge.	Each department, bank etc., does easiest thing leading to 'spotty' development by the less poor, leaving poorer in gaps.	SFs and MFs have access to water through the market or their own sources.	Rolling, programme, area by area, with melas for credit, drilling and installation.	Some gain control through own sources, others through buyers' market for water.	Full information in advance of mela. All can apply. Subsequently allocations left to the market.	All gain except mela. perhaps those with supplies already.
Organisation for equity	Groundwater below dusters of S and MFs, and scarce groundwater with resource-poor farmers.	Equity in operation not a concern of banks, commercial suppliers, or departments.	Provide equitable access to resource-poor farmers.	Where new lifts installed.	Rights established before water supplied. Organise groups early.	Customary and/or legal establishment of rights requires special attention.	Larger farmers may lose indirectly from competition where water scarce.

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